THE JOURNAL

—OF THE—

FRANKLIN INSTITUTE,

DEVOTED TO

SCIENCE AND THE MECHANIC ARTS.

EDITED BY

Mr. Theo. D. Rand, Chairman; Prof. Arthur Beardsley, C.E., Ph.D., Mr. James Christie, Dr. H. W. Jayne, Prof. Coleman Sellers, E.D., Committee on Publications;

with the Assistance of

Dr. Wm. H. Wahl, Secretary of the Institute.

VOL. CLIII.—Nos. 913-918.

(77TH YEAR.)

JANUARY-JUNE, 1902.

PHILADELPHIA:

Published by the Institute, at the Hall, 15 South Seventh Street.

1902.

OBERLIN COLLEGE LIBRARY

Exchange.

V.
19

OBERLIN
COLLEGE
LIBRARY

WITHDRAWN
1 5 OCT 25
OBERLIN COLLEGE
LIBRARY

JOURNAL OF THE FRANKLIN INSTITUTE.

Vol. CLIII.—January-June, 1902.

INDEX.

Acoustics and gravitation, resumé of recent work in. (Stradling) . . . 79
Alternators, parallel operation of. (Lincoln) 241
Aluminum bronzes, tests of 300
Amateur Photographic Exchange Clubs, 1860-64. (Himes) 359
American Electrochemical Society 92
Alasko-Canadian frontier. (Balch) 161
Alloys, binary, on the constitution of. (Matthews) 1, 93, 221
Alternators, parallel operation of. (Lincoln) 241
Artesian well at Grenelle, France 385
Atmosphere, gases of the. (Keller) 419
Atom, the divisibility of the. (Mackenzie) 451
Autumnal haze, cause of 469

Baker, John G. Memorial of 141
Balch, Thos. Willing. The Alasko-Canadian frontier 161

Book Notices:

Electrical railway handbook (Herrick), Lessons in practical electricity (Swoope), Electrical catechism (Shepardson), 75; Jahrbuch der Elektrochemie (Nernst-Borchers), The induction motor (Behrend), 76; Water and water-supplies (Thresh), Furnace-draught (Christie), Linear drawing and lettering (Fish), 236; Volumetric analysis (Coblentz), Dynamo-electric machines (Wiener), 312; Water-tube boilers (Robertson), Electro-magnets (Mansfield), Encyclopédia scientifique des aide-mémoire, La Convention du Mètre, etc. (Guillaume), 313; Lessons in applied electricity (Swoope), 394; Engineering index (Suplee-Cuntz), Laboratory guide to qualitative analysis (Bailey), 395; American standard specifications for steel (Colby), Annuaire pour l'an 1902 (Gauthier-Villars), 470; Theory of steel concrete arches, etc. (Cain), Jahrbuch für das Eisenhüttenwesen (Vogel), ... 471

Bradbury, Robt. H. The Goldschmidt process of reduction and the production of high temperatures 79
Bronzes, aluminum test of 300

Cements, the inspection and testing of. (Humphrey) 23, 93
Chain-gear, silent, the Renold. (Nixon) 321

Chromic acid and the soluble chromates, a rapid method of determining. (Kebler) 57
"City of Trenton," discussion of the explosion of boiler of the . . 321, 431
Copper tubes, electrolytic 340
C. P., What does the designation mean? (Kebler) 53

Darling, James D. Manufacture and uses of metallic sodium 65
Report on his electrolytic method for producing nitric acid and metals from fused nitrates 61
Diehl, August. Peculiarities of the writing of healthy persons 468
Divisibility of the atom. (Mackenzie) 451

Electrical measuring instruments. (Haskins) 320
Electricity direct from coal 378
on shipboard 92
Electrochemical polarization. (Reed) 259
Electrolytic copper tubes 340
lead and oxides 450
separation of tin 220
Electro-plating baths 370
Energy of the universe 257
Evolution of firearms and ordnance. (Wheeler) 193
Explosion of the boiler of the "City of Trenton." (Discussion) . 321, 431

Faught, Luther R. Memorial of 301
Firearms and ordnance, evolution of. (Wheeler) 193

FRANKLIN INSTITUTE:
Amendments to by-laws 395, 472
Annual election 145
Annual report of the Board of Managers with appendices 146
Annual reports of the Directors of the Schools of Drawing, Machine Design and Naval Architecture, 1901–1902 391
Committee on Science and the Arts:
Membership of, increased to sixty 396
Reports:
Tabor molding machine, 315; "Star" ventilator, 316; Walsh's aventurine glass, Hammer's experiments in long-distance transmission, Rites' governor system, 317; Bierbaum's trolley wheel, 318; American Roller Bearing Company's bearing, Toerring's enclosed arc lamp, 396; Bradley's stencil machine, Wagner Electric Company's single-phase motor, Taylor-White process for tool steel, 397; Crocker-Wheeler's electric-brake motor, Lincoln's synchronism indicator, 398; nutrinm, a new food product, 399; Williams, Brown and Earle's kerosene oil incandescent light 473
Proceedings of Stated Meetings, December, 1901 to May, 1902, 76, 145, 236 314, 395, 471
Sections:
Proceedings of 78, 159, 239, 319, 399, 474
Joseph Harrison, gift of portrait of 76

Membership fees, increase of 395
Metric system, committee appointed to report on 237, 400
Resolutions to promote commerce 77
French patent regulations, new 258
Fuel oil on the Southern Pacific Railroad 417
tests, Texas 284

Garrison, F. L. Review of the mining industries of the U. S. 379
Gelatin, physical and chemical properties of 417
Goldschmidt process of reduction and the production of high temperature. (Bradbury) 79
welding process 310

Harmonic curves known as Lissajous figures. (Richards) 269
Haupt, Lewis M. Single-curved *vs.* double-straight jetties 295
Haskins, Caryl D. Electrical measuring instruments 320
Hot waves, mechanism and causation of. (Watts) 285
Humphrey, Richard L. The inspection and testing of cements. (Discussion) 23, 93
Hydrogen, liquefaction of 75

Incandescent electric lamp, heat of the 21
Indigo, artificial 50
Infusorial earth, uses of 64
Iron pigment, a new 283
vessels, protective coatings for the immersed portions of 143
Ives, Frederic E. A novel stereogram 51
A photomicrographic device 371
The half-tone trichromatic process 43

Jetties, single-curved *vs.* double-straight. (Haupt) 295

Kebler, Lyman F. A rapid method for chromic acid and the soluble chromates 57
What does the designation C. P. mean? 53
Keller, H. F. The gases of the atmosphere 419

Lead and oxides, electrolytic 450
Lincoln, Paul M. Parallel operation of alternators 241
Liquefaction of hydrogen 75
Lissajous figures, on the harmonic curves known as. (Richards) . . . 269
Luminous paints, phosphorescent compounds for 294

Mackenzie, A. Stanley. The question of the divisibility of the atom . . 451
Marble in Alaska 309
Mathews, John Alexander. Upon the constitution of binary alloys, 1, 93, 221
Metric system of weights and measures. (Report of special committee and discussion) 401
Microscopic organisms in determining geologic age. (Woolman) . . . 400
Mining industries of the U. S., review of. (Garrison) 379
Monochromatic coatings on German-silver and platinum 230

National bureau of standards. (Stratton) 81
Natural gas, waste of 60
Nernst electric lamp. American type of, observations on. (Rowland) . 319
Nitric acid and metals, Darling's electrolytic method for, from fused nitrates. Report on 61
Nixon, J. O. The Renold silent chain-gear 321

OBITUARY NOTICES:
John G. Baker 141
Luther R. Faught 301
Stacy Reeves 389
Joseph Richards 387

Parallel operation of alternators. (Lincoln) 241
Patent regulations, new French 258
Phosphorescent compounds for luminous paints 294
Photographic permanence and the Amateur Photographic Exchange Clubs, 1860–64. (Himes) 359
Photomicrographic device, a. (Ives) 371
Pigment, iron, a new 283
Polarization, electrochemical. (Reed) 259
Pollution of streams by mining companies 357
Powders, metallic, solidifying by pressure 293
Protective coatings for the immersed portions of iron vessels 143

Recovery of tin from waste tin-cuttings 300
Reed, Chas. J. Electrochemical polarization 259
REEVES, STACY. Memorial of 389
Renold silent chain-gear. (Nixon) 321
Reversal of the photographic image and its subsequent development in actinic light. (Wilbert) 231
Richards, Horace C. On the harmonious curves known as Lissajous figures 269
Richards, Jos. W. The electrochemical industries at Niagara Falls . . 471
RICHARDS, JOSEPH. Memorial of 387
Rowland, Arthur J. Observations on the American type of the Nernst electric lamp 319
Rubber in Venezuela 385

Sapphires in Montana 63
North Carolina 450
Science and industrial supremacy 22
Shop management (Taylor) 400
Smoke nuisance in Prussia 386
Sodium, metallic, manufacture and uses of. (Darling) 65
Solidifying metallic powders by pressure 293
Steam boilers, construction and inspection of, with especial reference to the "City of Trenton" disaster. (Discussion). 321, 431
Stereogram, a novel. (Ives) 51
Stonehenge monuments, age of the 300

Stradling, Geo. F. Resumé of recent work in acoustics and gravitation, 79
Stratton, Samuel W. The National Bureau of Standards 81
Subterranean temperature 284

Talking with Mars 386
Taylor, F. W. Shop management 400
Telegraphy, progress of 64
Texas fuel oil tests 284
Tin, electrolytic separation of 220
recovery of from waste tin-cuttings 300
the sparse distribution of 56
Trichromatic process, half-tone. (Ives) 43

Utilization of trolley circuits for fire-extinguishing purposes 386

Veneered doors 52

Watts, Harvey W. On the mechanism and causation of hot waves . . 285
Wheeler, Joseph. Evolution of firearms and ordnance 193
White lead process, a new 293
Wilbert, M. I. On the reversal of the photographic image and its subsequent development in actinic light 231
Wireless telegraphy, invention of 257
Wood-pulp industry 55
Woolman, Lewis. Microscopic organisms in the determination of geologic age 400
Writing of healthy persons, peculiarities of. (Diehl) 468